WHAT IS CLAIMED IS:

1. A thin-film magnetic head comprising:

a lower core layer having an upper surface;

a gap layer formed on the lower core layer;

an upper magnetic layer for determining a track width formed on the gap layer, the width of the upper magnetic layer being smaller than that of the lower core layer;

an upper core layer formed on the upper magnetic layer; and

a gap depth determining insulating layer for determining a gap depth which is a depth of an interface between the gap layer and the upper magnetic layer in a height direction extending from an opposing face opposing a recording medium, the gap depth determining insulating layer disposed adjacent to the upper surface in a posterior region extending from the opposing face in the height direction;

wherein a contacting face between the upper magnetic layer and the gap depth determining insulating layer is provided at a contacting location deeper in the height direction than a forming location at which the gap depth is formed.

2. A thin-film magnetic head according to Claim 1, wherein the contacting face between the upper magnetic layer and the gap depth determining insulating layer is provided so as to be gradually deeper in the height direction from the bottom to the top of the contacting face.

3. A thin-film magnetic head according to Claim 2, wherein the gap depth determining insulating layer is provided with a sloping face formed so as to be gradually deeper in height direction from the bottom to the top of the sloping face, and wherein the upper magnetic layer is continuously provided on the gap layer and the sloping face of the gap depth determining insulating layer.

4. A thin-film magnetic head according to Claim 1, wherein an angle formed by the upper surface of the lower core layer and a virtual plane including the top edge of the bottom edge of the contacting face between the gap layer and the gap depth determining insulating layer is in the range of about 45° to 90°.

5. A thin-film magnetic head according to Claim 4, wherein the angle formed by the upper surface of the lower core layer and the virtual plane including the top edge and the bottom edge of the contacting face between the gap layer and the gap depth determining insulating layer is about 80° or less.

6. A thin-film magnetic head according to Claim 1, wherein an angle formed by the upper surface of the lower core layer and a virtual plane including the top edge and the bottom edge of a contacting face between the lower magnetic layer and the gap depth determining insulating layer is in the range of about 45° to 90°.

7. A thin-film magnetic head according to Claim 6, wherein the angle formed by the upper surface of the lower core layer and the virtual plane including the top edge and the bottom edge of the contacting face between the lower magnetic layer and the gap depth determining insulating layer is about 80° or less.

8. A thin-film magnetic head according to claim 2, wherein the gap depth determining insulating layer is provided with a vertical face at the opposing face side, the vertical face being approximately vertical along the lower core layer, and wherein the back end of the gap layer in the height direction and the back end of the interface between the gap layer and the upper magnetic layer in the height direction are in contact with the vertical face.

9. A thin-film magnetic head according to Claim 1, wherein the gap depth determining insulating layer comprises an organic material.

10. A thin-film magnetic head according to Claim 9, wherein the gap depth determining insulating layer comprises an ultraviolet photocurable resin material.

11. A thin-film magnetic head according to Claim 1, wherein the gap depth determining insulating layer comprises an inorganic material.

12. A thin-film magnetic head according to Claim 11, wherein the gap depth determining insulating layer comprises one of SiO_2 and Al_2O_3.

13. A thin-film magnetic head according to Claim 1, wherein the gap layer comprises a nonmagnetic metal material which can be applied by plating.

14. A thin-film magnetic head according to Claim 13, wherein the nonmagnetic metal material is at least one selected from the group consisting of NiP, NiPd, NiW, NiMo, NiRh, Au, Pt, Rh, Pd, Ru, and Cr.

15. A thin-film magnetic head according to Claim 14, wherein the nonmagnetic metal material is NiP, and the P content in the NiP measured by inductively coupled plasma

emission spectrometry is in the range of about 11 to 14 mass percent.

16. A thin-film magnetic head according to Claim 15, wherein the nonmagnetic metal material is NiP, and the P content in the NiP measured by inductively coupled plasma emission spectrometry is in the range of about 12.5 to 14 mass percent.

17. A thin-film magnetic head according to Claim 1,

further comprising an insulating layer formed in a posterior region of the gap depth determining insulating layer in the height direction so as to be in contact therewith, and a coil layer provided on the insulating layer inducing a recording magnetic field in the upper core layer and the lower core layer,

wherein, when an interface between the upper magnetic layer and the upper core layer is a reference plane, the upper surface of the insulating layer is at the same level as the reference plane.

18. A thin-film magnetic head according to Claim 17,

wherein the insulating layer is provided so as to cover the gap depth determining insulating layer and to be in contact with the back end of the upper magnetic layer in the

height direction.

19. A thin-film magnetic head according to Claim 17, wherein the insulating layer is an inorganic insulating layer comprising an inorganic material.

20. A thin-film magnetic head according to Claim 17, further comprising a back gap layer formed in the insulating layer in a posterior region of the gap depth determining insulating layer in the height direction so as to be in contact with the lower core layer, the back gap layer comprising at least one of a magnetic metal material and a nonmagnetic metal material;

wherein the upper surface of the back gap layer is at the same level as the reference plane and the upper surface of the insulating layer, and a base portion of the upper core layer is magnetically coupled with the back gap layer.

21. A thin-film magnetic head according to Claim 17, further comprising a lead electrode layer formed under the insulating layer, and a back gap layer formed on the lead electrode layer, the back gap layer comprising at least one of a magnetic metal material and a nonmagnetic metal material;

wherein the upper surface of the back gap layer is at

the same level as the reference plane and the upper surface of the insulating layer, and a terminal of the coil layer is electrically connected with the back gap layer.

22. A thin-film magnetic head according to Claim 20, wherein the back gap layer is a multiple-layer film having the same laminated structure as that formed of the lower magnetic layer, the gap layer, and the upper magnetic layer.

23. A thin-film magnetic head according to Claim 20, wherein the back gap layer is a single layer film composed of the same material as one of a material for the lower core layer and a material for the upper core layer.

24. A thin-film magnetic head according to Claim 20, wherein the back gap layer is one of a single layer film and a multiple-layer film, the back gap layer composed of a magnetic metal material differing from one of a material for the lower core layer and a material for the upper core layer.

25. A method for manufacturing a thin-film magnetic head comprising the steps of:

(a) forming a gap depth determining insulating layer on

a lower core layer at a predetermined distance extending from an opposing face opposing a recording medium in a height direction so as to form a sloping front edge face of the gap depth determining insulating layer at the opposing face side, wherein the sloping front edge face gradually departs from the opposing face in the height direction from the bottom at the lower core layer to the top of the front edge face;

(b) forming a gap layer on the lower core layer from the opposing face to the sloping front edge face of the gap depth determining insulating layer;

(c) forming an upper magnetic layer for determining a track width continuously on the gap layer and the sloping front edge face of the gap depth determining insulating layer, the width of the upper magnetic layer being restricted to be smaller than that of the lower core layer; and

(d) forming an upper core layer on the upper magnetic layer.

26. A method for manufacturing a thin-film magnetic head according to Claim 25,

wherein step (a) further comprises the substeps of:

(a1) forming a resist layer to be formed as the gap depth determining insulating layer on the lower core layer;

(a2) heating the resist layer so as to form the sloping front edge face of the gap depth determining insulating layer; and

(a3) exposing the resist layer to ultraviolet light so as to cure the gap depth determining insulating layer.

27. A method for manufacturing a thin-film magnetic head according to Claim 25, wherein step (a) further comprises the substeps of:

(a1) forming one of an inorganic material layer and an organic material layer to be formed as the gap depth determining insulating layer adjacent to the lower core layer;

(a2) forming a resist layer on one of the inorganic material layer and the organic material layer;

(a3) heating the resist layer so as to form a sloping face thereon equivalent to the sloping front edge face formed on the gap depth determining insulating layer; and

(a4) etching one of the inorganic material layer and the organic material layer using the resist layer as a mask so as to form the gap depth determining insulating layer.

28. A method for manufacturing a thin-film magnetic head according to Claim 25,

wherein the sloping front edge face of the gap depth

determining insulating layer is formed in step (a) so that an angle formed by the upper surface of the lower core layer and a virtual plane including the top edge and the bottom edge of a contacting face between the gap depth determining insulating layer and the gap layer formed in the step (b) is in the range of about 45° to 90°.

29. A method for manufacturing a thin-film magnetic head according to Claim 28,

wherein the sloping front edge face of the gap depth determining insulating layer is formed in the step (a) so that the angle formed by the upper surface of the lower core layer and the virtual plane including the top edge and the bottom edge of the contacting face between the gap depth determining insulating layer and the gap layer formed in the step (b) is about 80° or less.

30. A method for manufacturing a thin-film magnetic head according to Claim 25,

wherein the sloping face of the gap depth determining insulating layer is formed in step (a) so that an angle formed by the upper surface of the lower core layer and a virtual plane including the top edge and the bottom edge of a contacting face between the gap depth determining insulating layer and the lower magnetic layer formed in step

(b) is in the range of about 45° to 90°.

31. A method for manufacturing a thin-film magnetic head according to Claim 30, wherein the sloping face of the gap depth determining insulating layer is formed in step (a) so that the angle formed by the upper surface of the lower core layer and the virtual plane including the top edge and the bottom edge of the contacting face between the gap depth determining insulating layer and the lower magnetic layer formed in [the] step (b) is about 80° or less.

32. A method for manufacturing a thin-film magnetic head according to Claim 25, further comprising, following the step (c):

a step (e) of forming an insulating layer on the lower core layer in a posterior region of the gap depth determining insulating layer in the height direction and planarizing the upper surface of the insulating layer so as to be at the same level as the upper surface of the upper magnetic layer;

a step (f) of forming a coil layer on the planarized insulating layer; and

a step (g) of forming the upper core layer on the upper

magnetic layer.

33. A method for manufacturing a thin-film magnetic head according to Claim 32, further comprising the steps of, at least prior to the step (e), forming a back gap layer composed of at least one of a magnetic metal material and a nonmagnetic material in a posterior region of the gap depth determining insulating layer in the height direction, exposing the upper surface of the back gap layer in the step (e), and magnetically coupling a base portion of the upper core layer with the back gap layer in the step (g).

34. A method for manufacturing a thin-film magnetic head according to Claim 32, further comprising the steps of, at least prior to the step (e), forming a back gap layer composed of at least one of a magnetic metal material and a nonmagnetic material to be electrically connected with a lead electrode layer, exposing the upper surface of the back gap layer in the step (e), and electrically connecting a terminal of the coil layer with the back gap layer in the step (f).

35. A method for manufacturing a thin-film magnetic head according to Claim 33, wherein, when the gap layer is

formed on the lower core layer with or without the lower magnetic layer disposed under the gap layer in the step (b), and the upper magnetic layer is formed on the gap layer and the gap depth determining insulating layer in the step (c), the back gap layer is simultaneously formed so as to be connected with at least one of the upper core layer and the coil layer.

36. A method for manufacturing a thin-film magnetic head according to Claim 33, wherein the back gap layer comprises the same material as that used for one of the lower core layer and the upper core layer.

37. A method for manufacturing a thin-film magnetic head according to Claim 33, wherein the back gap layer is composed of one of a single layer film and a multiple-layer film, which comprises a magnetic metal material differing from one of a material for the lower core layer and a material for the upper core layer.

38. A method for manufacturing a thin-film magnetic head according to Claim 25, wherein the gap layer in the step (b) and at least one of the upper magnetic layer in the step (c) and the lower magnetic layer in the step (b) are sequentially formed by plating.

39. A method for manufacturing a thin-film magnetic head according to Claim 38, wherein the gap layer is formed by plating of a nonmagnetic metal material selected from the group consisting of NiP, NiPd, NiW, NiMo, NiRh, Au, Pt, Rh, Pd, Ru, and Cr.

40. A method of manufacturing a thin-film magnetic head according to Claim 39, wherein the nonmagnetic metal material forming the gap layer by plating is NiP, and the P content in the NiP measured by inductively coupled plasma emission spectrometry is in the range of about 11 to 14 mass percent.

41. A method for manufacturing a thin-film magnetic head according to Claim 40, wherein the nonmagnetic metal material forming the gap layer by plating is NiP, and the P content in the NiP measured by inductively coupled plasma emission spectrometry is in the range of about 12.5 to 14 mass percent.

42. A thin-film magnetic head according to Claim 1, further comprising a lower magnetic layer disposed between the gap layer and the lower core layer.

43. A method for manufacturing a thin-film magnetic head according to Claim 25, wherein step (b) further comprises forming the gap layer with a lower magnetic layer formed under the gap layer.